

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A method of manufacturing a semiconductor device, the method comprising:

forming an opening in a porous dielectric layer comprising a first low-k material overlying a substrate, the opening defined by sidewalls of the porous dielectric layer having exposed pores;

sealing exposed pores in the sidewalls by depositing:

a swelling agent lining the sidewalls and heating to swell the porous dielectric layer; and depositing a barrier metal layer lining the opening.

2. (Original) The method according to claim 1, further comprising:

filling the opening with metal; and

conducting chemical mechanical polishing (CMP) such that an upper surface of the metal filling the opening is substantially coplanar with an upper surface of the porous dielectric layer.

3. (Original) The method according to claim 2, comprising:

forming the opening as a dual damascene opening;

filling the opening with copper (Cu) or a Cu alloy as the metal, wherein the porous dielectric layer has a dielectric constant (k) less than 3.5.

4. (Previously Presented) A method of manufacturing a semiconductor device, the method comprising:

forming an opening in a porous dielectric layer comprising a first low-k material overlying a substrate, the opening defined by sidewalls of the porous dielectric layer having exposed pores; sealing exposed pores in the sidewalls by depositing:

a swelling agent lining the sidewalls and heating to swell the porous dielectric layer;

an adhesion promoter lining the sidewalls; or

a layer of dielectric material on the sidewalls; and

depositing a barrier metal layer lining the opening, the method, comprising depositing the swelling agent, adhesion promoter or layer of dielectric material at a thickness substantially equal to a largest dimension of the exposed pores.

5. (Original) The method according to claim 4, comprising depositing the swelling agent, adhesion promoter or layer of dielectric material at a thickness of 10Å to less than 300Å.

6. (Original) The method according to claim 5, comprising depositing the swelling agent, adhesion promoter or layer of dielectric material at a thickness of 10Å to 250Å.

7. (Cancelled)

8. (Original) The method according to claim 1, comprising sealing the pores by:
depositing a swelling agent lining the sidewalls;
heating to swell the porous dielectric layer; and
rinsing with water.

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9. (Original) The method according to claim 8, comprising heating at a temperature of 25°C to 200°C.

Claims 10-20. (Cancelled).

21. (New) The method according to claim 1, comprising depositing the swelling agent and subsequently heating to swell the porous dielectric layer.